

which is a divisional of U.S. Serial No. 08/906,140 filed August 5, 1997, now issued as U.S. Patent No. 5,986,020.

IN THE CLAIMS:

Please cancel claims 1-35

Claims 36-51 are presented herein. These claims were added with a Preliminary Amendment in the previous case and are presented herein for ease of reference. These claims 36-51 should be added prior to examination.

1. (Cancelled) A method for producing hyperbranched polymers, said method comprising the step of heating a polymerizable reaction charge comprising (a) a monomer mixture comprising (i) at least one monoethylenically unsaturated monomer in an amount of about 50-99.9% by weight of the monomer mixture and (ii) one or more multiethylenically unsaturated monomers in an amount of about 0.1-50% by weight of the monomer mixture, and (b) if at least one ethylenically unsaturated monomer of said monomer mixture is not a thermally initiating monomer, a free radical polymerization initiator, to a temperature in the range from about 250°C to about 400°C in a continuous reactor which allows mixing of the reactor contents for a residence time of from about 2 minutes to about 60 minutes, provided that if the total amount of multiethylenically unsaturated monomer is less than 3% by weight of the monomer mixture then at least one of said one or more multiethylenically unsaturated monomers must be tri- or greater ethylenically unsaturated.

2. (Cancelled) The method of claim 1, wherein the multiethylenically unsaturated monomer is selected from the group consisting of diethylenically unsaturated monomers, triethylenically unsaturated monomers, tetraethylenically unsaturated monomers and mixtures thereof.

3. (Cancelled) The method of claim 2, wherein the temperature is in the range from about 300°C to about 350°C.

4. (Cancelled) The method of claim 3, wherein the continuous reactor is a continuous stirred tank reactor or a continuous loop reactor.

5. (Cancelled) The method of claim 4, wherein the multiethylenically unsaturated monomer is divinylbenzene.

6. (Cancelled) The method of claim 5, wherein the monoethylenically unsaturated monomer is styrene or a mixture of styrene and another monoethylenically unsaturated monomer.

7. (Cancelled) The method of claim 6, wherein the other monoethylenically unsaturated monomer is selected from the group consisting of α -methylstyrene, acrylic acid, methacrylic acid, methyl methacrylate, butyl acrylate, butyl methacrylate, hydroxyethyl methacrylate, hydroxypropyl methacrylate and hydroxypropyl acrylate.

8. (Cancelled) The method of claim 7, wherein the divinylbenzene is present in the monomer mixture in an amount in the range from about 10% by weight to about 15% by weight of the polymer.

9. (Cancelled) The method of claim 8, wherein the residence time is from about 10 minutes to about 20 minutes.

10. (Cancelled) The method of claim 9, wherein the reactor is substantially filled.

11. (Cancelled) A hyperbranched polymer produced by the method comprising the step of heating a polymerizable reaction charge comprising (a) a monomer mixture comprising (i) at least one monoethylenically unsaturated monomer in an amount of 50-99.1% by weight of the monomer mixture and (ii) one or more multiethylenically unsaturated monomers in an amount of about 0.1-50% by weight of the monomer mixture, and (b) if at least

one ethylenically unsaturated monomer mixture is not a thermally initiating monomer, a free radical polymerization initiator, to a temperature in the range from about 250°C to about 400°C in a continuous reactor which allows mixing of the reactor contents for a residence time of from about 2 minutes to about 60 minutes, provided that if the total amount of multiethylenically unsaturated monomer is less than 3% by weight of the monomer mixture then at least one of said one or more multiethylenically unsaturated monomers must be tri- or greater ethylenically unsaturated.

12. (Cancelled) The hyperbranched polymer of claim 11, wherein the multiethylenically unsaturated monomer is selected from the group consisting of diethylenically unsaturated monomers, triethylenically unsaturated monomers, tetraethylenically unsaturated monomers and mixtures thereof.

13. (Cancelled) The hyperbranched polymer of claim 12, wherein the temperature is in the range from about 300°C to about 350°C.

14. (Cancelled) The hyperbranched polymer of claim 13, wherein the continuous reactor is a continuous stirred tank reactor or a continuous loop reactor.

15. (Cancelled) The hyperbranched polymer of claim 14, wherein the multiethylenically unsaturated monomer is divinylbenzene.

16. (Cancelled) The hyperbranched polymer of claim 15, wherein the monoethylenically unsaturated monomer is styrene or a mixture of styrene and another monoethylenically unsaturated monomer.

17. (Cancelled) The hyperbranched polymer of claim 16, wherein the other monoethylenically unsaturated monomer is selected from the group consisting of α -methylstyrene, acrylic acid, methacrylic acid, methyl methacrylate, butyl acrylate, butyl methacrylate, hydroxyethyl methacrylate, hydroxypropyl methacrylate and hydroxypropyl acrylate.

18. (Cancelled) The hyperbranched polymer of claim 17, wherein the divinylbenzene is present in the monomer mixture in an amount in the range from about 10% by weight to about 15% by weight of the polymer.

19. (Cancelled) The hyperbranched polymer of claim 18, wherein the residence time is from about 10 minutes to about 20 minutes.

20. (Cancelled) The hyperbranched polymer of claim 19, wherein the reactor is substantially filled.

21. (Cancelled) A hyperbranched polymer comprising at least about 3% by weight of repeat units derived from divinylic monomers, about 50 to about 97% by weight of repeat units derived from monoethylenically unsaturated monomers and having a polydispersity of less than about 20.

22. (Cancelled) The hyperbranched polymer of claim 19 with at least 6% by weight of repeat units derived from divinylic monomers.

23. (Cancelled) A hyperbranched polymer, comprising at least 6% by weight of repeat units derived from divinylic monomers, about 50 to 94% by weight of repeat units derived from monoethylenically unsaturated monomers, and having a polydispersity of less than about 20 and a number average molecular weight of from about 300 to about 10,000, wherein the monoethylenically unsaturated monomers are selected from the group consisting of styrene, α -methylstyrene, vinyl toluene, 4-methylstyrene, tertbutylstyrene, 2-chlorostyrene, vinylpyridine, vinylpyrrolidone, maleic anhydride, methyl crotonoate, sodium crotonoate, acrylic acid and its salts, methyl acrylate, ethyl acrylate, propyl acrylate, isopropyl acrylate, butyl acrylate, 2-ethylhexyl acrylate, decyl acrylate, hydroxyethyl acrylate, hydroxypropyl acrylate, methacrylic acid and its salts, methyl methacrylate, ethyl methacrylate, propyl methacrylate, hydroxypropyl methacrylate, isopropyl methacrylate, butyl methacrylate, sec-butyl methacrylate, isobutyl methacrylate, n-amyl methacrylate, isoamyl methacrylate, n-hexyl methacrylate, tert-butyl methacrylate, 2-ethylhexyl methacrylate, n-octyl methacrylate, methallyl methacrylate,

phenyl methacrylate, benzyl methacrylate, allyl methacrylate, cyclohexyl methacrylate, 2-hydroxyethyl methacrylate, 2-hydroxypropyl methacrylate, N,N-dimethylaminoethyl methacrylate, N,N-diethylaminoethyl methacrylate, tert-butylaminoethyl methacrylate, 2-sulfoethyl methacrylate, trifluoroethyl methacrylate, glycidyl methacrylate, 2-n-butoxyethyl methacrylate, 2-chloroethyl methacrylate, 2-ethylbutyl methacrylate, cinnamyl methacrylate, cyclopentyl methacrylate, 2-ethoxyethyl methacrylate, furfuryl methacrylate, hexafluoroisopropyl methacrylate, 3-methoxybutyl methacrylate, 2-methoxybutyl methacrylate, 2-nitro-2-methylpropyl methacrylate, 2-phenoxyethyl methacrylate, 2-phenylethyl methacrylate, propargyl methacrylate, tetrahydrofurfuryl methacrylate, tetrahydropyranyl methacrylate, methacrylamide, N-methylmethacrylamide, N-ethylmethacrylamide, N,N-diethylmethacrylamide, N,N-dimethylmethacrylamide, N-phenylmethacrylamide, acrylamide, N,N-diethylacrylamide, N-ethylacrylamide, methyl 2-cyanoacrylate, methyl alpha-chloroacrylate, methacrolein, acrolein, methacrylonitrile, acrylonitrile, and mixtures thereof.

24. (Cancelled) The hyperbranched polymer according to claim 23, wherein the divinylic monomers are selected from the group consisting of divinylbenzene, bis-(4-ethenylphenyl)methane, divinyldioxane, divinyl ether, 1,4-butanediol divinyl ether, hexanediol divinyl ether, cyclohexanediol divinyl ether, ethylene glycol divinyl ether, diethylene glycol divinyl ether, cyclohexanedimethanol divinyl ether, 1,3-divinyl-1,1,3,3-tetramethyldisilazane, divinyl 1,3-diphenyl-1,3-dimethyldisilazane, divinyl tetraethoxy-1,3-disilazane, divinyl tetramethoxy-1,3-disilazane, divinyl 1,3-diphenyl-1,3-dimethyl-1,3-disiloxane, divinylacetylene, N,N-divinylaniline, divinylcarbinol, divinylcarbonate, 1,2-divinylcyclobutane, cis-1,2-divinylcyclohexane, trans-1,2-divinylcyclohexane, 1,4-divinylcyclohexanedimethanol diether, divinyldibutyltin, 2,5-divinyldioxane, 1,1'-divinylferrocene, divinylformal, divinyl glycol, 1,4-divinylperfluorobutane, 1,6-divinylperfluorohexane, divinylphenylphosphine, 3,9-divinylspirobim-dioxane, divinylsulfone, 1,4-divinyl-1,1,4,4-tetramethyldisilylethylene, divinyl tin dichloride, divinyl triethylene glycol diether, 1,5-bis-divinyl-3-oxapentane, divinylsilane, divinyldiethoxysilane, divinyldimethylsilane, divinyl diphenylsilane, 1,1'-bis(2-vinyl-3-oxapentane)-4,4'-isopropylidene diphenol, ethylene glycol dimethacrylate, bisphenol A dimethacrylate, bisphenol A 2-hydroxyethyl dimethacrylate, 1,3-butylene glycol dimethacrylate, 1,4-butanediol

dimethacrylate, butenediol dimethacrylate, 2-butyl-2-ethyl-1,3-propanediol dimethacrylate, 2-butyne-1,4-diyl dimethacrylate, 1,4-cyclohexanediol dimethacrylate, decamethylene glycol dimethacrylate, diethylene glycol dimethacrylate, 2,3-dihydroxypropyl dimethacrylate, 1,6-dimethylhexanediol dimethacrylate, 2,5-dimethylhexanediol dimethacrylate, dipropylene glycol dimethacrylate, diurethane dimethacrylate, 1,12-dodecanediol dimethacrylate, ethyldene dimethacrylate, glycerol dimethacrylate, 1,5-tetrahydroperfluoropentyl dimethacrylate, hexafluorobisphenol A dimethacrylate, hexylene glycol dimethacrylate, hydrogenated bisphenol A dimethacrylate, methylene glycol dimethacrylate, neopentyl glycol dimethacrylate, 2,2,3,3,4,4,5,5-octafluorohexanediol 1,6-dimethacrylate, pentaerythritol dimethacrylate, 1,5-pentanediol dimethacrylate, perfluorocyclohexyl 1,4-dimethyl dimethacrylate, o-phenylene dimethacrylate, p-phenylene dimethacrylate, styrene glycol dimethacrylate, polyethylene glycol 600 dimethacrylate, polyethylene glycol 400 dimethacrylate, 1,2-propylene glycol dimethacrylate, propylene glycol dimethacrylate, sorbitol dimethacrylate, 4,4'-sulfonyl diphenol dimethacrylate, tetrabromo bisphenol A dimethacrylate, tetrachloro bisphenol A dimethacrylate, tetraethylene glycol dimethacrylate, 2,2,3,3-tetrafluorobutanediol dimethacrylate, triethylene glycol dimethacrylate, trimethyl pentanediol dimethacrylate, urethane dimethacrylate, zinc dimethacrylate, zirconium(IV) dimethacrylate, butanediol diacrylate, N,N-diacyloyl acrylamide, bisphenol A diacrylate, bisphenol A 2-hydroxyethyl diacrylate, 1,3-butylene glycol diacrylate, 1,4-butanediol diacrylate, 1,10-decanediol diacrylate, propoxylated neopentyl glycol diacrylate, ethoxylated bisphenol A diacrylate and dimethacrylate, ethylene glycol dimethacrylate, tetraethylene glycol diacrylate, tri-propylene glycol dimethacrylate, diethyl 1,3-propanediol diacrylate, diethylene glycol diacrylate, dimethyl bisphenol A diacrylate, dipropylene glycol diacrylate, ethyl 1,3-hexanediol diacrylate, ethylene diacrylate, ethyldene diacrylate, hexafluorobisphenol A diacrylate, 1,6-hexanediol diacrylate, 2,5-hexanediol diacrylate, neopentyl glycol diacrylate, propoxylated neopentyl glycol diacrylate, 1,9-nonamethylene diacrylate, 2,2,3,3,4,4,5,5-octafluorohexanediol 1,6-diacrylate, 1,5-pentanediol diacrylate, p-phenylene diacrylate, polyethylene glycol 400 diacrylate, 1,2-propylene glycol diacrylate, propylene glycol diacrylate, sorbitol diacrylate, tetrabromobisphenol A diacrylate, polyethylene glycol 200 diacrylate, 2,2,3,3-tetrafluorobutanediol diacrylate, thiol diethylene glycol diacrylate, triethylene glycol diacrylate, tripropylene glycol diacrylate, urethane diacrylate, zinc diacrylate,

diethylene glycol diacryloxypropionate, bis-acryloyl piperazine, diallyl maleate, and mixtures thereof.

25. (Cancelled) The hyperbranched polymer according to claim 23, wherein the divinylic monomers comprise divinylbenzene.

26. (Cancelled) The hyperbranched polymer according to claim 23, further comprising repeat units derived from tri- or greater ethylenically unsaturated monomers.

27. (Cancelled) The hyperbranched polymer according to claim 26, wherein the tri- or greater ethylenically unsaturated monomers are selected from the group consisting of triethylenically unsaturated monomers and tetraethylenically unsaturated monomers.

28. (Cancelled) The hyperbranched polymer according to claim 23, wherein the repeat units derived from monoethylenically unsaturated monomers are derived from styrene or a mixture of styrene and at least a second monoethylenically unsaturated monomer.

29. (Cancelled) The hyperbranched polymer according to claim 28, wherein the second monoethylenically unsaturated monomer is selected from the group consisting of α -methylstyrene, acrylic acid, methacrylic acid, methyl methacrylate, butyl acrylate, butyl methacrylate, hydroxyethyl methacrylate, hydroxypropyl methacrylate, and hydroxypropyl acrylate.

30. (Cancelled) A hyperbranched polymer, comprising at least 6% by weight of repeat units derived from divinylic monomers, about 50 to 94% by weight of repeat units derived from monoethylenically unsaturated monomers, and having a polydispersity of less than about 20 and a number average molecular weight of from about 300 to about 10,000, wherein the divinylic monomers are selected from the group consisting of divinylbenzene, bis-(4-ethenylphenyl)methane, divinyldioxane, divinyl ether, 1,4-butanediol divinyl ether, hexanediol divinyl ether, cyclohexanediol divinyl ether, ethylene glycol divinyl ether, diethylene glycol divinyl ether, cyclohexanedimethanol divinyl ether, 1,3-divinyl-1,1,3,3-

tetramethyldisilazane, divinyl 1,3-diphenyl-1,3-dimethyldisilazane, divinyl tetraethoxy-1,3-disilazane, divinyl tetramethoxy-1,3-disilazane, divinyl 1,3-diphenyl-1,3-dimethyl-1,3-disiloxane, divinylacetylene, N,N-divinylaniline, divinylcarbinol, divinylcarbonate, 1,2-divinylcyclobutane, cis-1,2-divinylcyclohexane, trans-1,2-divinylcyclohexane, 1,4-divinylcyclohexanedimethanol diether, divinyldibutyltin, 2,5-divinyldioxane, 1,1'-divinylferrocene, divinylformal, divinyl glycol, 1,4-divinylperfluorobutane, 1,6-divinylperfluorohexane, divinylphenylphosphine, 3,9-divinylspirobim-dioxane, divinylsulfone, 1,4-divinyl-1,1,4,4-tetramethyldisilyethylene, divinyl tin dichloride, divinyl triethylene glycol diether, 1,5-bis-divinyloxy-3-oxapentane, divinylsilane, divinyldiethoxysilane, divinyldimethylsilane, divinylidiphenylsilane, 1,1'-bis(2-vinyloxyethoxy)-4,4'-isopropylidene diphenol, ethylene glycol dimethacrylate, bisphenol A dimethacrylate, bisphenol A 2-hydroxyethyl dimethacrylate, 1,3-butylene glycol dimethacrylate, 1,4-butanediol dimethacrylate, butenediol dimethacrylate, 2-butyl-2-ethyl-1,3-propanediol dimethacrylate, 2-butyne-1,4-diyl dimethacrylate, 1,4-cyclohexanediol dimethacrylate, decamethylene glycol dimethacrylate, diethylene glycol dimethacrylate, 2,3-dihydroxypropyl dimethacrylate, 1,6-dimethylhexanediol dimethacrylate, 2,5-dimethylhexanediol dimethacrylate, dipropylene glycol dimethacrylate, diurethane dimethacrylate, 1,12-dodecanediol dimethacrylate, ethylidene dimethacrylate, glycerol dimethacrylate, 1,5-tetrahydroperfluoropentyl dimethacrylate, hexafluorobisphenol A dimethacrylate, hexylene glycol dimethacrylate, hydrogenated bisphenol A dimethacrylate, methylene glycol dimethacrylate, neopentyl glycol dimethacrylate, 2,2,3,3,4,4,5,5-octafluorohexanediol 1,6-dimethacrylate, pentaerythritol dimethacrylate, 1,5-pentanediol dimethacrylate, perfluorocyclohexyl 1,4-dimethyl dimethacrylate, o-phenylene dimethacrylate, p-phenylene dimethacrylate, styrene glycol dimethacrylate, polyethylene glycol 600 dimethacrylate, polyethylene glycol 400 dimethacrylate, 1,2-propylene glycol dimethacrylate, propylene glycol dimethacrylate, sorbitol dimethacrylate, 4,4'-sulfonyl diphenol dimethacrylate, tetrabromo bisphenol A dimethacrylate, tetrachloro bisphenol A dimethacrylate, tetraethylene glycol dimethacrylate, 2,2,3,3-tetrafluorobutanediol dimethacrylate, triethylene glycol dimethacrylate, trimethyl pentanediol dimethacrylate, urethane dimethacrylate, zinc dimethacrylate, zirconium(IV) dimethacrylate, butanediol diacrylate, N,N-diacyloyl acrylamide, bisphenol A diacrylate, bisphenol A 2-hydroxyethyl diacrylate, 1,3-butylene glycol diacrylate,

1,4-butanediol diacrylate, 1,10-decanediol diacrylate, propoxylated neopentyl glycol diacrylate, ethoxylated bisphenol A diacrylate and dimethacrylate, ethylene glycol dimethacrylate, tetraethylene glycol diacrylate, tri-propylene glycol dimethacrylate, diethyl 1,3-propanediol diacrylate, diethylene glycol diacrylate, dimethyl bisphenol A diacrylate, dipropylene glycol diacrylate, ethyl 1,3-hexanediol diacrylate, ethylene diacrylate, ethyldene diacrylate, hexafluorobisphenol A diacrylate, 1,6-hexanediol diacrylate, 2,5-hexanediol diacrylate, neopentyl glycol diacrylate, propoxylated neopentyl glycol diacrylate, 1,9-nonamethylene diacrylate, 2,2,3,3,4,4,5,5-octafluorohexanediol 1,6-diacrylate, 1,5-pantanediol diacrylate, p-phenylene diacrylate, polyethylene glycol 400 diacrylate, 1,2-propylene glycol diacrylate, propylene glycol diacrylate, sorbitol diacrylate, tetrabromobisphenol A diacrylate, polyethylene glycol 200 diacrylate, 2,2,3,3-tetrafluorobutanediol diacrylate, thiol diethylene glycol diacrylate, triethylene glycol diacrylate, tripropylene glycol diacrylate, urethane diacrylate, zinc diacrylate, diethylene glycol diacryloxypropionate, bis-acryloyl piperazine, diallyl maleate, and mixtures thereof.

31. (Cancelled) The hyperbranched polymer according to claim 30, wherein the divinylic monomers comprise divinylbenzene.

32. (Cancelled) The hyperbranched polymer according to claim 30, further comprising repeat units derived from tri- or greater ethylenically unsaturated monomers.

33. (Cancelled) The hyperbranched polymer according to claim 32, wherein the tri- or greater ethylenically unsaturated monomers are selected from the group consisting of triethylenically unsaturated monomers and tetraethylenically unsaturated monomers.

34. (Cancelled) The hyperbranched polymer according to claim 30, wherein the repeat units derived from monoethylenically unsaturated monomers are derived from styrene or a mixture of styrene and at least a second monoethylenically unsaturated monomer.

35. (Cancelled) The hyperbranched polymer according to claim 34, wherein the second monoethylenically unsaturated monomer is selected from the group consisting of α -

methylstyrene, acrylic acid, methacrylic acid, methyl methacrylate, butyl acrylate, butyl methacrylate, hydroxyethyl methacrylate, hydroxypropyl methacrylate, and hydroxypropyl acrylate.

36. (New) A continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product comprising:

(a) continuously charging into a reactor monomers comprising divinylic monomers comprising at least one divinylic monomer and monoethylenically unsaturated monomers comprising at least one monoethylenically unsaturated monomer;

(b) maintaining a level in the reactor such that the reactor is at least substantially filled; and

(c) polymerizing the monomers to produce a polymeric product, wherein the polymeric product is formed substantially free of gel.

37. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 36, wherein the monomers comprise at least about 3% by weight of the divinylic monomers comprising at least one divinylic monomer and about 50% to about 97% by weight of the monoethylenically unsaturated monomers comprising the at least one monoethylenically unsaturated monomer.

38. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 37, wherein the monomers comprise at least 6% by weight of the divinylic monomers and from about 50% to 94% by weight of the monoethylenically unsaturated monomers.

39. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 37, wherein the monomers comprise from 12% to about 30% by weight of the divinylic monomers.

40. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 36, wherein the divinylic monomers comprise divinyl benzene.

41. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 36, wherein the divinylic monomers consist of divinyl benzene.

42. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 36, wherein (c) further comprises maintaining the temperature of the reactor at a temperature of from about 250°C to about 400°C.

43. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 36, further comprising adding a radical initiator to the reactor while the monomers are continuously charged into the reactor.

44. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 43, wherein the initiator is mixed with the monomers when the monomers are continuously charged into the reactor or the initiator is added to the reactor from a feed separate from the monomers.

45. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 36, further comprising adding a solvent to the reactor.

46. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 45, wherein the solvent is selected from the group consisting of n-hexane, toluene, propylene glycol monomethyl ether acetate, 2-ethyl-1-hexanol, 1-octanol, tripropylene glycol methyl ether, acetone, methyl iso-butyl carbinol, diethyleneglycol butyl ether, propylene glycol, tert-butyl ether, ethyl 3-ethoxypropionate, ethylene glycol monobutyl ether, ethylene glycol monomethyl ether acetate, 2-ethylhexyl acetate, diacetone alcohol, ethylene glycol 2-ethylhexyl ether, cyclohexanol, 2-ethyl-1-butanol, N-methyl-2-pyrrolidone, dipropylene glycol butyl ether, 2-methyl-1-butanol, 1-pentanol, diethylene glycol butyl ether acetate, diethylene glycol

monomethyl ether, propylene glycol monobutyl ether, benzyl alcohol, 1-methoxy-2-butanol, propylene glycol propyl ether, 2-methyl-1-pentanol, diethylene glycol monoethyl ether, ethylene glycol hexyl ether, sec-butanol, tert-amyl alcohol, phenol, tert-butanol, tripropylene glycol, ethylene glycol diacetate, dipropylene glycol methyl ether n-butanol, furfuryl alcohol, isobutanol, diethylene glycol monoethyl ether acetate, ethylene glycol monoethyl ether, diethylene glycol monopropyl ether, isopropanol, tetraethylene glycol, ethylene glycol propyl ether, n-propanol, ethylene glycol methyl ether, propylene glycol propyl ether, tetrahydrofurfuryl alcohol, acetonitrile, 2-phenoxyethanol, dimethyl sulfoxide, hexylene glycol, allyl alcohol, 2-pyrrolidinone, ethanol, triethylene glycol, and methanol.

47. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 36, wherein the monomers are in a mixture comprising the monomers and a surfactant or a chain transfer agent.

48. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 36, wherein the reactor is a continuous stirred tank reactor or a continuous loop reactor.

49. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 36, wherein (c) further comprises maintaining a residence time of from about 2 minutes to about 60 minutes in the reactor.

50. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 36, wherein (c) further comprises maintaining a residence time of from about 10 minutes to about 20 minutes in the reactor.

51. (New) The continuous, high temperature polymerization process for preparing a substantially gel-free polymerized polymeric product according to claim 36, wherein the at least one monoethylenically unsaturated monomer is selected from the group consisting of

styrene, α -methylstyrene, vinyl toluene, 4-methylstyrene, tertbutylstyrene, 2-chlorostyrene, vinylpyridine, vinylpyrrolidone, maleic anhydride, methyl crotonoate, sodium crotonoate, acrylic acid and its salts, methyl acrylate, ethyl acrylate, propyl acrylate, isopropyl acrylate, butyl acrylate, 2-ethylhexyl acrylate, decyl acrylate, hydroxyethyl acrylate, hydroxypropyl acrylate, methacrylic acid and its salts, methyl methacrylate, ethyl methacrylate, propyl methacrylate, hydroxypropyl methacrylate, isopropyl methacrylate, butyl methacrylate, sec-butyl methacrylate, isobutyl methacrylate, n-amyl methacrylate, isoamyl methacrylate, n-hexyl methacrylate, tert-butyl methacrylate, 2-ethylhexyl methacrylate, n-octyl methacrylate, methallyl methacrylate, phenyl methacrylate, benzyl methacrylate, allyl methacrylate, cyclohexyl methacrylate, 2-hydroxyethyl methacrylate, 2-hydroxypropyl methacrylate, N,N-dimethylaminoethyl methacrylate, N,N-diethylaminoethyl methacrylate, tert-butylaminoethyl methacrylate, 2-sulfoethyl methacrylate, trifluoroethyl methacrylate, glycidyl methacrylate, 2-n-butoxyethyl methacrylate, 2-chloroethyl methacrylate, 2-ethylbutyl methacrylate, cinnamyl methacrylate, cyclopentyl methacrylate, 2-ethoxyethyl methacrylate, furfuryl methacrylate, hexafluoroisopropyl methacrylate, 3-methoxybutyl methacrylate, 2-methoxybutyl methacrylate, 2-nitro-2-methylpropyl methacrylate, 2-phenoxyethyl methacrylate, 2-phenylethyl methacrylate, propargyl methacrylate, tetrahydrofurfuryl methacrylate, tetrahydropyranyl methacrylate, methacrylamide, N-methylmethacrylamide, N-ethylmethacrylamide, N,N-diethylmethacrylamide, N,N-dimethylmethacrylamide, N-phenylmethacrylamide, acrylamide, N,N-diethylacrylamide, N-ethylacrylamide, methyl 2-cyanoacrylate, methyl alpha-chloroacrylate, methacrolein, acrolein, methacrylonitrile, acrylonitrile, and mixtures thereof.